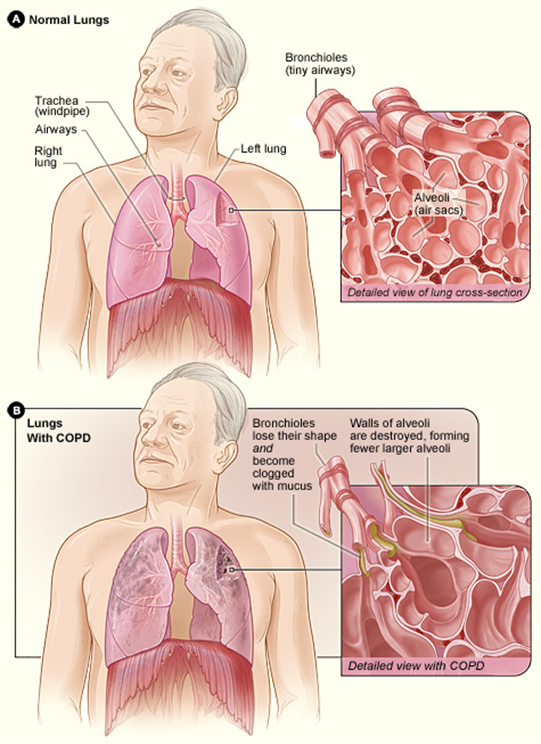
Wiki

COPD/Pulmonary Assessment and Treatment

Objectives:

1. Understand COPD signs, symptoms, and GOLD stages
2. Know the difference between Chronic Bronchitis and Emphysema
3. Grasp all the important and unique aspects of pulmonary evaluation
4. Be able to recognize important and relevant outcome measures
5. Recognize correct intervention techniques and application

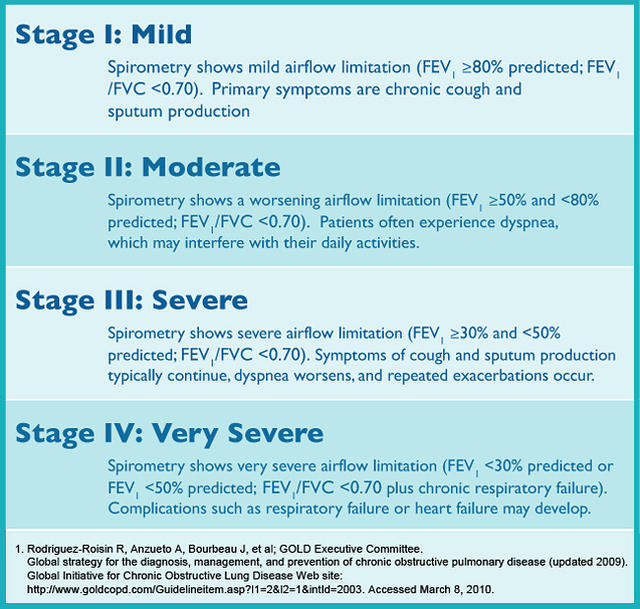
Respiratory problems are a common problem in the elderly population. Chronic Obstructive Pulmonary Disease (COPD) is one of the most prevalent and debilitating, as it is the third largest cause of death in the United States. COPD is a progressive disease which is most commonly caused by cigarette smoking making it hard to breathe. This occurs primarily in the sixth decade of life due to loss of airway elasticity, airway destruction and inflammation, and increased mucus production leading to blockage all of which decrease airflow.



Signs and Symptoms include coughing (with mucus), wheezing, shortness of breath, a feeling of chest tightness, frequent infections, blueness in the lips/nail beds, and fatigue. In addition, those with COPD are at higher risk for a variety of other conditions such as hypertension, diabetes, falls, and cancer. Those with COPD often falls into two distinguishable categories: Emphysema (resulting from destruction and enlargement of air spaces) and Chronic Bronchitis (due to inflammation and increased mucus).

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| **COPD differentiation** | Emphysema: | Chronic Bronchitis: |
| Appearance | “Pink puffer”  Barrel Chest - increased AP diameter | “Blue bloater” |
| Dyspnea | Progressive, constant, severe | Intermittent |
| Sputum/Mucus | Little | Markedly increased |
| Auscultation | Diminished sounds | Wheezes and Rhonchi noted |
| Arterial Blood Gasses | 02-mildly decreased at rest (hypoxemia)  C02-normal to low (respiratory alkalosis) | 02-moderate to severely decreased (hypoxemia)  C02-increased (respiratory acidosis) |
| Lung Volumes | TLC- very increased  RV- very increased | TLC- normal to slightly increased  RV- slightly increased |

There are four stages of severity from mild to very severe, as detailed below, based on measurements of how much a person can breathe in and out.

**The Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria**

Assessments:

Patients with COPD can benefit from Physical Therapy in order to address exercise capacity, strengthening, health/wellness, and quality of life. There is currently a Global Initiative for Chronic Obstructive Lung Disease (GOLD) which recommends spirometry has the main diagnostic and prognostic tool. Important aspects of any evaluation include symptoms, severity of airflow limitation, history of exacerbations, and comorbidities.

Common Tests and Measures:

* Vitals
  + HR – should be in normal range of 60-100
  + RR – should be between 12-20 breaths per minute with an inspiration: expiration ratio of 1:2.
    - However, COPD typically has longer expiratory ratio (1:3 or 1:4)
  + BP – should be in the normal range of 120/80
  + O2 – want to be above 92%
* Visual Inspection – Barrel Chest is very common with COPD. This leads to a decrease in ability to exhale and decreased muscle efficiency. Look for accessory muscle use.
* Aerobic capacity/endurance
  + 1.5 mile run, 1 mile walk, and 6 min walk tests are common ways to measure this. 6 min walk test has been shown to correlate with abilities to do ADLs in those with COPD.
* Dyspnea Rating Scale – Shortness of breath often significantly impacts the daily lives of those with Chronic Obstructive Pulmonary Disorder.
* Auscultation of Lungs – should be clear. Be able to identify:
  + Wheezes – high pitched whistling often caused by narrow airways.
  + Rales – crackling sound often caused by congestion
  + Rhonchi – low pitched wheeze often caused by mucus.
* Pulmonary Function Tests/Incentive Spirometry
  + Forced Expiratory Volume in 1 second (FEV1) and forced vital capacity (FVC) are critical and reliable measure in determining severity of COPD.
  + FEV1/FVC should be approximately 70-85% however it will be decreased (often around 45%) with those with pathologies such as COPD.
* Overall Upper and Lower Body Strength and ROM
* Chest Expansion/Diaphragm/Segmental Function
  + Feel movement in the upper, middle, and lower portions of the lungs and make sure they are performed in the correct sequence.
* Quality of Life (SF-36) – Recognize that anxiety and depression are common in the geriatric COPD population. Some scales also address physical and mental aspects.

COPD Interventions:

* Patient Education - Energy conservation techniques, general exercise protocol, lifestyle modifications such as smoking cessation and proper nutrition, and prevention.
* Aerobic Conditioning – such as walking, bicycling, or swimming for a recommended total of 20-30 minutes per day. Pace breathing during exercise (1:2 ratio of inspiration to expiration)
  + This is effective because we will be making the muscles of the circulatory system more effective and efficient. This reduces the burden on the lungs due to increased O2 deliverance and decreased O2 need.
  + Can be continuous or interval type
  + High intensity has been shown to be better however base off of individual characteristics.
  + Make sure to provide extended warm up and cool down.
* General Strengthening – Upper and Lower Extremities.
  + Helpful in those with COPD due to decreasing peripheral oxygen demand and increasing ease of oxygen dissociation.
  + 8-10 exercises should be done at 60-80% 1 rep max with 8-15 repetitions.
* Aquatics
  + The reviewed articles covered incremental therapeutic aquatic exercise with an intensity ranging from 50% to 90% of maximal oxygen consumption (VO2max) with sessions of 30 to 50 minutes 2 to 5 days a week, for a total of 8 to 24 weeks at a temperature of 29 ºC to 38 ºC
  + Monitor how the patient feels through the Dyspnea scale.
* Postural Drainage (possibly with percussion/vibration) – aids in secretion clearance.
* Airway secretion clearance techniques (mostly for chronic bronchitis)
  + Teach assisted coughing techniques such as a deep huff cough.
* Chest Mobility –
  + PNF, resistive, expansion, lateral leans, and butterfly exercises are all useful
  + Mobilizations are possible however remain cautions.
* Address Posture – reduce kyphotic posture to aid in ease of breathing and mechanics.
* Breathing Exercises/Training (diaphragmatic breathing, pursed-lip breathing, incentive spirometry) – goal = to retrain muscles.
  + Steps to Pursed-Lip Breath:
    - Relax your neck and shoulders
    - Breathe in through your nose for two seconds
    - Breath out through a small hole in your mouth for 4 seconds (or double the amount of time you took a breath in)
  + Pursed Lip breathing is effective for those with COPD due to prevention of the collapsibility of the airspaces. The small hole keeps the pressure up and prevents closure.

In general, Physical Therapy is crucial to break the cycle of difficulty in activates leading to decreased movement leading to muscle atrophy leading to increased effort in movement culminating in avoidance of activity and possible depression. PT can also play a vital role in prevention of hospitalization and secondary complications which can present due to comorbidities such as COPD. Remember to always be monitoring vitals before, throughout, and after treatment. However, as always, keep in mind that a multidisciplinary client based approach is the best method.

For more information, below is a link to many articles by the APTA about a variety of considerations in patients with COPD:

<http://ptjournal.apta.org/collection/chronic-obstructive-pulmonary-disease>

<http://www.copdfoundation.org/>

Resources:

<http://www.nhlbi.nih.gov/health/health-topics/topics/copd>

<http://www.leadingage.org/Physical_Therapy_Can_Improve_COPD_Patients_Quality_of_Life.aspx>

<http://www.moveforwardpt.com/symptomsconditionsdetail.aspx?cid=81bd8afa-de6a-48f3-8abd-01c6ef98e83d>

<http://www.webmd.com/lung/copd/pulmonary-rehabilitation-for-copd>

Wakabayashi R, Motegi T, Yamada K, Ishii T, Gemma A, et al. Presence of In-Home Caregiver and Health Outcomes of Older Adults with Chronic Obstructive Pulmonary Disease*. Journal of American Geriatrics Society*. Jan 2011; 59(1):44-49

Karavatas S.The Integration of the Guide to Physical Therapy Practice in the Management of a Geriatric Patient With Chronic Obstructive Pulmonary Disease. *Topics in Geriatric Rehabilitation*. 2005; 21(2):127-132

R. Martín-Valero, A. I. Cuesta-Vargas and M. T. Labajos-Manzanares. Types of Physical Exercise Training for COPD Patients, Chronic Obstructive Pulmonary Disease - Current Concepts and Practice, Dr. Kian-Chung Ong (Ed.) 2012.

Vestbo J, Hurd S, Agustı A, Jones P, Vogelmeier C, et al. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. *Am J Respir Crit Care Med*. Feb 2013; 187(4):347–365

Additional Beneficial References specifically for Physical Therapy:

Eleonore F van Dam van Isselt, Karin H Groenewegen-Sipkema, Monica Spruit-van Eijk, Niels H Chavannes, Wilco P Achterberg. Geriatric rehabilitation for patients with advanced COPD: programme characteristics and case studies. *International Journal of Palliative Nursing* 2013, Vol 19, No 3 141-146

Peruzza S, Sergi G, Vianello A, Pisent C, Tiozoo F, et al. Chronic obstructive pulmonary disease (COPD) in elderly subjects: impact on functional status and quality of life. Respiratory Medicine, Volume 97, Issue 6 , 612 - 617

Garrod R, Lasserson T. Role of physiotherapy in the management of chronic lung diseases: An overview of systematic reviews. Respir Med (2007)